Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims 1 - 31 (cancelled)

Claim 32. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) providing a chamber;

(b) introducing aluminum oxide particles and carbon particles into the provided chamber;

(c) reacting the aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles with the mixing aluminum oxide particles and carbon particles being at a temperature sufficient to convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride; and

(d) removing the aluminum oxynitride from the chamber.

Claim 33. (previously presented) The method recited in claim 32 wherein the temperature is in a range of about 1700-1900°C.

Claim 34. (previousy presented) A method of making aluminum oxynitride, the method comprising:

(a) providing a chamber;

(b) introducing aluminum oxide particles and carbon particles into the provided chamber;

(c) reacting the aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles with the mixing aluminum oxide particles and carbon particles being at a temperature maintained constant during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride; and

(d) removing the aluminum oxynitride from the chamber.

Claim 35. (previously presented) The method recited in claim 34 wherein the temperature is in a range of about 1700-1900°C.

Claim 36. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) providing a chamber;

(b) introducing aluminum oxide particles and carbon particles into the provided chamber;

(c) reacting aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles;

mixing the aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles with the mixing aluminum oxide particles and carbon particles being at a constant temperature during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride; and

(d) continuously removing the aluminum oxynitride from the chamber.

Claim 37. (previously presented) The method recited in claim 36 wherein the temperature is in a range of about 1700-1900°C.

Claim 38. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) providing a chamber;

(b) introducing aluminum oxide particles and carbon particles into the provided chamber;

(c) reacting the aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles with the chamber; and

providing a temperature in a range of about 1700-1900°C during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride; and

(d) removing the aluminum oxynitride from the chamber.

Claim 39. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) providing a chamber;

(b) introducing aluminum oxide particles and carbon particles into the provided chamber;

(c) reacting the aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles;

having the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles at a temperature selected to convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride; and

(d) removing the aluminum oxynitride from the chamber.

Claim 40. (previously presented) The method recited in claim 39 wherein the temperature of the chamber is in a range of about 1700-1900°C.

Claim 41. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) providing a chamber;

(b) introducing aluminum oxide particles and carbon particles into the provided chamber;

(c) reacting aluminum oxide particles and carbon particles introduced into the provided chamber with nitrogen, comprising:

mixing the aluminum oxide particles and carbon particles within the provided chamber,

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles with the chamber; and

having the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles at a temperature maintained and sufficient to convert the aluminum

oxide particles, carbon particles and nitrogen into the aluminum oxynitride during the conversion process.

Claim 42. (previously presented) The method recited in claim 36 wherein the temperature is in a range of about 1700-1900°C.

Claim 43. (previously presented) The method recited in claim 41 including removing the aluminum oxynitride from the chamber.

Claim 44. (previously presented) The method recited in claim 41 including continuously removing the aluminum oxynitride from the chamber.

Claim 45. (previously presented) The method recited in claim 43 wherein the temperature is in a range of about 1700-1900°C.

Claim 46. (previously presented) The method recited in claim 44 wherein the temperature is in a range of about 1700-1900°C.

Claim 47. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) providing a chamber;

(b) continuously introducing aluminum oxide particles and carbon particles into the provided chamber;

(c) reacting aluminum oxide particles and carbon particles continuously introduced into the provided chamber with nitrogen, comprising:

continuously mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles with the mixing aluminum oxide particles and carbon particles being at a temperature to continuously convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride and wherein said the

temperature of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles is maintained during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 48. (previously presented) The method recited in claim 47 wherein the temperature is in a range of about 1700-1900°C.

Claim 49. (previously presented) The method recited in claim 47 including removing the aluminum oxynitride from the chamber.

Claim 50. (previously presented) The method recited in claim 47 including continuously removing the aluminum oxynitride from the chamber.

Claim 51. (previously presented) The method recited in claim 50 wherein the temperature is in a range of about 1700-1900°C.

Claim 52. (previously presented) The method recited in claim 49 wherein the temperature is in a range of about 1700-1900°C.

Claim 53. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) providing a chamber;

(b) continuously introducing aluminum oxide particles and carbon particles into the provided chamber;

(c) reacting aluminum oxide particles and carbon particles continuously introduced into the provided chamber with nitrogen, comprising:

continuously mixing and heating the provided chamber with the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles; and

wherein heating of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles being sufficient to convert the aluminum oxide particles, carbon particles and nitrogen into aluminum oxynitride to convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride and wherein the temperature of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles is maintained during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 54. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) providing a chamber;

(b) continuously introducing aluminum oxide particles and carbon particles into the provided chamber;

(c) reacting aluminum oxide particles and carbon particles continuously introduced into the provided chamber with nitrogen, comprising:

heating the provided chamber;

continuously mixing the aluminum oxide particles and carbon particles within the provided chamber;

passing nitrogen gas over the mixing aluminum oxide particles and carbon particles; and

including heating of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles to continuously convert the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride and wherein the temperature of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles sufficient to convert the aluminum oxide particles, carbon particles and nitrogen into aluminum oxynitride

during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 55 (previously presented) The method recited in claim 54 wherein the mixing comprises rotating the chamber.

Claim 56. (previously presented) The method recited in claim 54 wherein the heating is at a temperature of about 1700°C or higher.

Claim 57. (previously presented) The method recited in claim 56 wherein the mixing comprises rotating the chamber.

58. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) introducing aluminum oxide particles and carbon particles into a chamber; and

(b) mixing the aluminum oxide particles and carbon particles within the chamber while passing nitrogen gas over the aluminum oxide particles and carbon particles during the mixing with the temperature of the mixing aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles being sufficient to convert the aluminum oxide particles, carbon particles and nitrogen into aluminum oxynitride during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

59. (previously presented) The method recited in claim 58 wherein the temperature is in a range of about 1700-1900 °C.

60. (previously presented) A process for making aluminum oxynitride comprising:

(a) providing a chamber,

(b) introducing aluminum oxide particles and carbon particles into the chamber,

(c) mixing the aluminum oxide particles and carbon particles while passing nitrogen gas thereover at a temperature sufficient to form the aluminum oxynitride, and

(d) removing said aluminum oxynitride from the chamber.

61. (previously presented) The process recited in claim 60 wherein the temperature is within a range of about 1700-1900 ºC.

62. (previously presented) The process recited in claim 60 wherein the temperature is held substantially constant.

63. (previously presented) The process recited in claim 62 wherein the temperature is within a range of about 1700-1900 ºC.

64. (previously presented) The process recited in claim 60 wherein the aluminum oxide particles and carbon particles are introduced continuously while said aluminum oxynitride is removed continuously.

65. (previously presented) The process recited in claim 64 wherein the temperature is within a range of about 1700-1900 ºC.

66. (previously presented) The process recited in claim 64 wherein the temperature is held substantially constant.

67. (previously presented) The process recited in claim 66 wherein the temperature is within a range of about 1700-1900 ºC.

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76. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) introducing aluminum oxide particles and carbon particles into a chamber; and

(b) mixing the aluminum oxide particles and carbon particles within the chamber while passing nitrogen gas over the aluminum oxide particles and carbon particles during the mixing with the temperature of the aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles being sufficient to convert the aluminum oxide particles, carbon particles and nitrogen into aluminum oxynitride during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

77. (previously presented) The process recited in claim 76 wherein the temperature is within a range of about 1700-1900 ºC during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

78. (previously presented) The process recited in claim 76 wherein the temperature is held substantially constant during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

79. (previously presented) The process recited in claim 78 wherein the temperature is within a range of about 1700-1900 ºC during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

80. (previously presented) The process recited in claim 76 wherein the aluminum oxide particles and carbon particles are introduced continuously while said aluminum oxynitride is removed continuously.

81. (previously presented) The process recited in claim 80 wherein the temperature is within a range of about 1700-1900 ºC during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

82. (previously presented) The process recited in claim 80 wherein the temperature is held substantially constant during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

83. (previously presented) The process recited in claim 82 wherein the temperature is within a range of about 1700-1900 ℃ during the conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride.

Claim 84. (previously presented The method of claim 32 , wherein the mixing comprises rotating the chamber.

Claim 85. (previously presented) The method of claim 84, further comprising:

forming the aluminum oxynitride into a transparent structure.

Claim 86. (previously presented) The method of claim 85, wherein forming the aluminum oxynitride comprises:

forming a green body comprising the aluminum oxynitride; and

sintering the green body.

Claim 87. (previously presented) The method of claim 86, further comprising: isostatically pressing the sintered green body under heat.

Claim 88. (previously presented) The method of claim 32, wherein the aluminum oxynitride comprises $Al_{23-1/3x}O_{27+x}N_{5-x}$, where $0.429 \leq x \leq 2$.

Claim 89. (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) introducing aluminum oxide particles and carbon particles into a chamber;

(b) mixing the aluminum oxide particles and the carbon particles in the chamber to provide a reaction mixture;

(c) heating the mixing reaction mixture at a temperature of between 1700°C and 1900°C for between 10 minutes and 30 minutes while nitrogen gas flows over the mixing reaction mixture to convert the aluminum oxide particles, carbon particles, and nitrogen to aluminum oxynitride; and

(d) removing the aluminum oxynitride from the chamber.

Claim 90. (previously presented) The method of claim 89, wherein the mixing reaction mixture provided in step (b) has an initial temperature, the method further comprising heating the mixing reaction mixture to raise the initial temperature from the initial temperature to the constant temperature.

Claim 91. (previously presented) The method recited in claim 90 wherein the temperature is ramped from the initial temperature to the constant temperature.

Claim 92. (previously presented) The method recited in claim 91 wherein the ramp rate is at least 10 degrees C per minute.

Claim 93 (previously presented) A method of making aluminum oxynitride, the method comprising:

(a) introducing aluminum oxide particles and carbon particles continuously into a chamber;

(b) continuously rotating the chamber to continuously mix the aluminum oxide particles and carbon particles within the chamber while passing nitrogen gas over the aluminum oxide particles and carbon particles during the mixing with the temperature of the aluminum oxide particles and carbon particles with the nitrogen gas passing over the mixing aluminum oxide particles and carbon particles being within a range of about 1700-1900 ºC and holding the temperature constant during conversion of the aluminum oxide particles, carbon particles and nitrogen into the aluminum oxynitride; and

removing the aluminum oxynitride continuously from the chamber.